

12 June 1968

TECHNICAL SPECIFICATIONS

ADVANCED ANAMORPHIC EYEPIECES FOR THE [] HIGH POWER STEREOVIEWER

1. INTRODUCTION

These technical specifications describe the requirements to be met in the fabrication of production Anamorphic Eyepieces for the [] High Power Stereoviewer (Twin Dynazoom).

2. CONCEPT

This fabrication will produce anamorphic eyepieces that can quickly and simply be attached to and removed from the High Power Stereoviewer. The anamorphic eyepieces must not significantly reduce the optical performance of the basic stereoviewer, and must be simple to operate. The production units will be produced in accordance with the prototype Anamorphic Eyepieces developed under Contract []

3. GENERAL DESCRIPTION

The [] High-Power Stereoviewer is used in conjunction with the [] objective lenses and compensating eyepieces. The objective magnifications are 3X, 6X, and 10X and the compensating eyepiece magnifications are 6X and 10X. In addition, a [] 1.3X objective is being used. The subject eyepieces will add an additional magnification range to one axis of the optical field. A standard High-Power Stereoviewer (HPSV) is therefore, defined as the instrument equipped with the objectives and eyepieces herein described.

4. REQUIREMENTS

4.1. Existing Instrument - The basic High Power Stereoviewer is described in [] publication Number 53-335; however, a significant improvement in the optical performance has been achieved utilizing the above mentioned [] objective lenses and compensating eyepieces. The anamorphic system must not significantly degrade the optical performance of this combination.

4.2. Optical

4.2.1. Anamorphic Range - The system shall have a continuously variable anamorphic magnification from 1X to 2.2X; i.e., the anamorphic ratio (ratio of the magnification of two perpendicular meridians of the optical field) shall be from 1:1 to 1:2.2. The measured anamorphic magnification ratios will all be within +5% of the indicated values when measured neglecting mechanical backlash.

4.2.2. Field - The maximum loss of field must not exceed 5% of the normal instrument's total field. The optical field flatness must be within 5% of the field flatness of the standard HPSV. Field flatness will be measured indirectly by using the fall-off of resolution at the field positions as compared to the axial resolution in both the standard HPSV and the HPSV equipped with the Anamorphic Eyepieces.

4.2.3. Resolution - Average resolution of Anamorphic Eyepieces will be at least 88% of resolution of standard HPSV. The resolution shall be measured axially and at three places at .8 of the field (0° , 120° , 240°). The axial resolution values of the Anamorphic Eyepieces will be 88% of those same values of the standard HPSV. Resolution readings will be made with all of the objective and eyepiece lenses at the highest and lowest zoom settings.

4.2.4. Image Run-Out - Image run-out, measured when the HPSV image rotation knob and/or the anamorphic orientation control is rotated through 360° will not exceed the sum of 1mm plus the run-out of standard HPSV. This means a dot on the object plane centered in the eyepiece focal plane will not move more than 1.0mm plus the run-out of the standard HPSV in the eyepiece focal plane of the anamorphic eyepiece when either the HPSV image rotator and/or the anamorphic orientation control is displaced through 360° . In other words, the dot, when first centered in a circle with a diameter of 2mm plus 2 times the run-out of the standard HPSV (run-out being defined as the distance a point moves from the center of the field of view when the image is rotated 360°), centered in the eyepiece focal plane will not move out of the circle when either of the controls is rotated 360° .

4.2.5. Focus - The HPSV equipped with the Anamorphic Eyepieces shall remain in focus throughout the microscope zoom range and anamorphic zoom range.

4.2.6. Light Transmission - The HPSV equipped with the anamorphic eyepieces will transmit at least 85% of the light transmitted by the standard HPSV at equal magnifications.

4.2.7 Anamorphic Axis Orientation - The direction of the anamorphic magnification (anamorphic axis) shall be rotatable through 360° .

4.2.8. Anamorphic Magnification - There will be no perceptible change to the image when the anamorphic axis orientation control is rotated when the anamorphic magnification is set at 1.0X. A grid will not be distorted when the anamorphic orientation control is rotated through 360° at an anamorphic magnification setting of 1.0X.

4.3. Physical Configuration - The eyepoint shall not be extended more than two inches from the position of the present eyepoint of the standard HPSV and an operator wearing glasses must be able to operate the instrument. The eye relief will be at least 90% of the standard HPSV equipped with Wild eyepieces. The interpupillary separation range of the HPSV equipped with the Anamorphic eyepieces shall be identical within 2.0mm to that of the standard HPSV. The range shall be no less than 56 to 71mm.

4.4. Interchangeability - The system must be configured to allow disassembly of the anamorphic system from the stereoviewer within one minute without the use of special tools. Accommodation must be made for utilizing the system on any ☐ High Power Stereoviewer.

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4.5. Carrying Case - A carrying case will be provided for each instrument.

4.6. Operator's Manual - A comprehensive operator's manual must be included with each unit.

5. TESTING PROCEDURE

5.1. All performance tests will be made on a GFE HPSV meeting the requirements set for instruments now in service. This shall constitute the inspection tool and is referred to as the "standard HPSV" in the specification as referenced in section 3.

5.2. Resolution targets will be high contrast type with black bars on white background.

5.3. All measurements except for determination of anamorphic magnification will be made at no anamorphic magnification.